(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau



(43) International Publication Date 28 July 2005 (28.07.2005)

PCT

(10) International Publication Number WO 2005/068813 A1

(51) International Patent Classification⁷: F02F 1/10, 1/16

(21) International Application Number:

PCT/JP2005/000631

(22) International Filing Date: 13 January 2005 (13.01.2005)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 2004-007133

14 January 2004 (14.01.2004)

(71) Applicant (for all designated States except US): TOY-OTA JIDOSHA KABUSHIKI KAISHA [JP/JP]; 1, Toyota-cho, Toyota-shi, Aichi, 4718571 (JP).

(72) Inventors; and

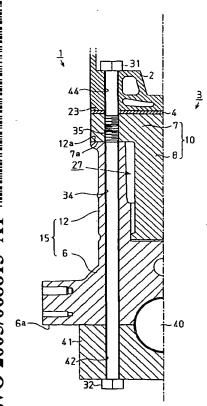
(75) Inventors/Applicants (for US only): Seiji [JP/JP]; c/o TOYOTA JIDOSHA KABUSHIKI KAISHA, 1, Toyota-cho, Toyota-shi, Aichi, 4718571 (JP). YAMADA, Ken [JP/JP]; c/o TOYOTA JIDOSHA KABUSHIKI KAISHA, 1, Toyota-cho, Toyota-shi, Aichi, 4718571 (JP).

(74) Agents: ONDA, Hironori et al.; 12-1, Ohmiya-cho 2-chome, Gifu-shi, Gifu, 5008731 (JP).

- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: FASTENING STRUCTURE FOR CYLINDER HEAD AND DIVIDED TYPE CYLINDER BLOCK OF ENGINE



(57) Abstract: A cylinder block 3 of an engine 1 is formed by assembling an inner block member 10 and an outer block member 15. The inner block member 10 includes an upper deck portion 7 integrated with a cylinder liner portion 8. The outer block member 15 includes a cylinder outer wall portion 12. The cylinder head 2 is fastened to an upper deck portion 7 with head bolts 31. The cylinder outer wall portion 12 is fastened to the upper deck portion 7 with block fastening bolts 32 at an opposite side of the upper deck portion 7 with respect to the cylinder head 2. The head bolts 31 and the block fastening bolts 32 are threaded with the upper deck portion 7 from the opposite sides with respect to each other. As a result, deformation of the upper deck portion 7 and inclination of the cylinder liner portion 8 due to fastening of the bolts 31, 32 are reliably prevented.

WO 2005/068813 A1



European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

with international search report